PRELIMINARY TECHNOLOGY ASSESSMENT

LED Retrofit Kits with ALC

What is this Technology?

Light Emitting Diode (LED) lamps last about twice as long as the typical fluorescent T8 and consume roughly half as much electricity. These LED retrofit kits are designed to upgrade existing recessed fluorescent troffer lighting to LED lighting without requiring a full fixture replacement or work in the ceiling plenum. This evaluation will test five different LED-based lighting systems with integrated advanced lighting controls (ALC).

Why is GSA Interested?

Lighting accounts for roughly 30% of total energy consumed by GSA buildings. Currently, office lighting is dominated by T8 and T12 fluorescent lamps. Retrofit kits that replace fluorescents with LEDs promise an easy path to upgrading energy efficiency with minimal disruption and expense. Results will determine if the technologies provide performance that is acceptable for one-for-one replacement and are intended to help shape Energy Savings Performance Contract (ESPC) specifications nationwide.

ENERGY EFFICIENCY LED lighting consumes about half as much electricity as fluorescent luminaires with equivalent light output. Previous GPG evaluations (GPG Reports 022 and 024) have demonstrated an additional 30% savings with integrated advanced lighting controls.

COST-EFFECTIVENESS Payback is currently estimated at less than six years in locations with average utility costs, three-tube T8 troffers, and 12-hour work days. Additional savings can be achieved when local light levels can be reduced without negative effect; for example, where two LED lamps replace three or four fluorescent lamps. The payback period is expected to shorten as increased LED market penetration reduces costs.

OPERATIONS & MAINTENANCE Potential O&M benefits include longer lamp life (no required relamping for ten or more years) and avoided disposal requirements associated with the mercury in fluorescent lamps. This evaluation will also assess ease of installation and controls integration.

OCCUPANT SATISFACTION LED retrofit kits are designed to deliver outstanding color rendering, direct light where it is needed, and minimize glare. Advanced lighting controls provide additional capability to deliver light only when and where it is needed, depending on occupancy and daylighting. A key component of this study will be to document the effect of this technology on occupant satisfaction.

DEPLOYMENT POTENTIAL LED luminaire retrofits are potentially suitable to most GSA office buildings with low-bay recessed fluorescent luminaires. Advanced lighting controls will be most effective in spaces with variable occupancy and/or high availability of daylight.

The Green Proving Ground program, in association with a federal laboratory, is subjecting LED retrofit kits with advanced lighting controls to real-world measurement and verification in GSA buildings. Results will be published on the GPG website, www.gsa.gov/gpg.

GPG Green Proving Ground Program

The Green Proving Ground program leverages GSA's real estate portfolio to test innovative building technologies. The program helps GSA meet its sustainability goals by providing actionable data that informs investment decisions targeted at energy-use reduction.